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ABSTRACT

The research on graduate students that has appeared in 20 academic journals since 1976 is reviewed. Ninety-four articles are classified into topic areas, and representative articles of each area are discussed. The research designs of the 94 research studies are considered with attention to: the level of students (master's or doctoral); whether single or multiple fields of study were examined; and whether single or multiple colleges were studied. Problems associated with research on graduate students are addressed, along with directions for future research. The most popular area of research has been the area of matriculation, which includes recruitment, admissions, decision to pursue advanced study and selection of college/field of study, financial aid, and student characteristics/expectations. Over a fourth of the articles fall into this category. The second most popular area has been the prediction of student performance. Other topics include: attrition and retention; gender differences in matriculation, sexual harassment, and employment; graduate assistants; standardized tests; careers and employment of graduates; minority graduate students; students' stress and anxiety; and the impact of marriage and family on graduate students. An 83-item reference list is included. (SW)

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A Decade of Research on Graduate Students: A Review of the Literature in Academic Journals

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This paper was presented at the annual meeting of the Association for the Study of Higher Education held at the Sheraton Inner Harbor Hotel in Baltimore, Maryland, November 21-24, 1987. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

A Decade of Research on Graduate Students: A Review of the Literature in Academic Journals

ABSTRACT

This paper reviews the research on graduate students that has appeared in academic journals since 1976. Niney-four articles are classified into topic areas, and representative articles of each area are discussed. Problems associated with research on graduate students are detailed, and directions for future research are provided.

Areas of research within the field of higher education are numerous and diverse, and the level of scholarly interest varies by topic. One particular area that has drawn differing levels of interest in the past is research related to students, in general, and graduate students, in particular. Recently, it was reported that the number of research articles on both graduate and undergraduate students that were published in eleven specific higher education journals decreased between 1969 and 1983 [36]. While the addition of new specialized academic journals was noted as a likely factor for the decrease of articles related to undergraduates, reasons were not offered for the decrease in articles pertaining to graduate students. It is likely that interest simply waned after the peak of graduate student enrollments in the mid-1970s.

Individuals have been conducting research on graduate students since the inception of graduate study in this country in the 1800s, but the volume of such research is relatively insignificant compared to research related to undergraduate students. The bulk of the research related to graduate students is relatively recent and coincides with the explosion of student interest in graduate study since 1960. The culminating efforts seem to have occurred in 1976 with the publication of several books devoted solely to research on graduate students [14, 33, 51, 69]. These books represent significant contributions to research in this area, but they also appear to mark the end of an intense era of research related to graduate students.

The purpose of this paper is to review the research on graduate students that has been conducted since 1976. The focus is on articles that have appeared in academic journals primarily related to the field of higher education. The articles are classified into topic areas, and

representative articles from each area are discussed. Problems associated with research on graduate students are detailed, and directions for future research are provided.

The Search Methodology

In an effort to locate articles, three separate search methods were employed: 1) an automated reference search, 2) a hand search of the Education Index, and 3) a hand search of the journals that publish research related to higher education in general. While this search was very thorough, it is possible that a few articles were inadvertently overlooked. Also, all non-research articles pertaining to graduate students and some research articles that were very discipline-specific were not included in the group to be reviewed. Examples of this latter group include 1) several articles that were published in the Journal of Education for Social Work and pertain specifically to the area of social work and 2) an entire issue of Communication Education (Vol. 28, No. 4) which emphasized the field of communication.

The Articles

The search produced 94 articles which were located in 20 different journals. Table 1 provides a breakdown of the journals by topic of research. Only the eleven journals that contained more than one article are listed individually in the table. The majority (75 percent) of the articles are contained in the following six journals: Research in Higher Education, Educational and Psychological Measurement, College Student Journal, Journal of College Student Personnel, College and University, and The Journal of Higher Education. The most popular vehicle of research on

TABLE 1

Types of Research Articles on Graduate Students and the Journals in which They Appear

Type of Research	Academic Journals												
	RHE	EPM	CSJ	JCSP	C&U	JHE	AERJ	ICUT	NAWDAC	Appl Psyc	Educ Psyc	Other	TOTAL
Matriculation	8	1	1	1	7			1		2		3	24
Predicting Success, Performance	2	8	2				1				2	1	16
Gender Differences, Women	5		2	1		2			2	1			13
Graduate Assistants	1		2	1		2	1	1				1	9
Standardized Tests		5				1						1	7
Employment, Career	1		1	2									4
Minorities				1		1	1					1	4
Stress and Anxiety			2	1							1		4
Attitudes toward Research	1			1								1	3
Impact of Marriage, Family									1			1	2
Attrition, Retention			1					1					2
Miscellaneous	2		2	2									6
TOTAL	20	14	13	10	7	6	3	3	3	3	3	9	94

Note:

RHE = Research in Higher Education

EPM = Educational and Psychological Measurement

CSJ = College Student Journal

JCSP = Journal of College Student Personnel

C&U = College and University

JHE = Journal of Higher Education

AERJ = American Educational Research Journal

ICUT = Improving College and University Teaching

NAWDAC = National Association of Women Deans, Administrators and Counselors Journal

Appl Psych = Journal of Applied Psychology

Educ Psych = Journal of Educational Psychology

Other = Education, Lifelong Learning, Journal of College Admissions, Journal of College Science Teaching, Journal of Experimental Education, Journal of Negro Education, Journal of Student Financial Aid, Phi Delta Kappan, Teaching of Psychology.

graduate students has been Research in Higher Education.

Four of these six journals published articles covering a variety of topics, but two of the journals have been quite limited in their scope. Virtually all of the articles that appear in Educational and Psychological Measurement pertain to standardized tests and the prediction of success and performance. All of the articles in College and University pertain to matriculation. Both of these results are understandable given the nature of the journals and their respective audiences.

As indicated in Table 1, the most popular area of research has been the area of matriculation which includes recruitment, admissions, and student characteristics. Over a fourth of the articles fall into this category. The second most popular area has been the prediction of student performance. A somewhat surprising finding is the lack of research on minority students which appears to be a slightly more popular topic at the undergraduate level [36]. Only four percent of the articles emphasized minority students.

Some of the articles do overlap topics, but the classification is an attempt to categorize the primary topic of each article. Each of the topics is discussed in some detail below, and a discussion of the general findings of some of the studies is also presented. The presentation follows the same general order as the listing in the table.

Matriculation

Twenty-four articles were included in the general area of matriculation which is very broad and is broken down into the following five subtopics: (1) recruitment, (2) admissions, (3) decision to pursue advanced study and selection of institution/field of study, (4) financial aid, and (5) student

characteristics/expectations. There is overlap among these subtopics, but each article does emphasize one subtopic more than the others.

Recruitment

Turcotte noted that

> Graduate education as an entity is perceived to be far behind the undergraduate in establishing a body of knowledge regarding admission characteristics and activities of students; methods of recruitment; utilization of available technology; centralization of effort and funding; enrollment management and modeling [76, p. 28].

From his nation-wide survey of graduate schools, he offered evidence to support the centralization of these efforts at the graduate level. Unfortunately, his results are difficult to interpret because only 35 percent of the graduate schools responded, and the only demographic variable provided was a public/private breakdown. Without other demographic information, such as the size and type of institutions and the highest degree offered, one cannot be sure of the representativeness of the sample which makes interpretation of the data difficult. One also must keep in mind that the respondents were from central administration, not from the individual academic departments, thus there may be a bias on the part of the respondents toward centralization.

Malaney [44] made the point that because of the discipline-specific nature of graduate education, recruitment activities can be centralized only superficially. He also discussed the importance of academic departments in the recruitment process, and he identified the vast range of recruitment activities undertaken by various departments [45].

Admissions

The admissions subtopic involves a variety of issues related to the admissions process itself. For instance, Millimet and Flume [50] collected data from 76 institutions in order to determine the "effective" admission standards in the field of psychology. They found that effective admission standards vary according to the national ranking of the program, with the higher ranked programs having the highest effective standards and the lower ranked programs having the lowest effective standards.

Wallace and Schwab [80] and Youngblood and Martin [83] looked at decision process modeling in graduate business programs and found, as did Millimet and Flume, that standardized test scores and undergraduate grades are important predictors of admission decisions. In addition, Wallace and Schwab found letters of recommendation to be of marginal importance. This latter point is interesting in light of the fact that Baxter, et al. [5] found letters of recommendation to be generally nondiscriminating, nonconsensual, and nondifferentiating in their descriptions of students.

Decision to Attend and Selection of Institution/Field

Several researchers have investigated the decisions to attend graduate school, in general, and particular institutions. Malaney [44] determined that the most important reasons for pursuing graduate study were a desire to learn and personal satisfaction, followed by reasons related to obtaining a job. He found that the most important reason for choosing the particular institution in his study was because of the perceived good reputations of the academic departments, followed by financial and geographic reasons. Lang [39] found that undergraduate achievement was the strongest influence on the rank of graduate school attended.

The most sophisticated study on entering graduate school was conducted by Ethington and Smart [19], who used data which were drawn from a longitudinal, multi-institutional study where college freshman were surveyed in 1970 and again in a follow-up survey in 1980. Restricting their sample to 6242 individuals, the authors proposed and tested a causal model regarding the decision to enter graduate school. They found that variables measuring background characteristics, institutional characteristics, undergraduate experiences, degree completion, and receipt of graduate financial aid accounted for 35.4 percent and 31.6 percent of the variance for men and women, respectively.

Turning to the selection of a field of study, Malaney [43] studied the characteristics of students in Biglan [8,9] areas of study. Malaney showed that the GRE quantitative score had the most impact on determining enrollment in the hard/soft science departments, as students with higher scores were more likely to be in the hard areas. Citizenship and the GRE verbal score had the most impact on the life/nonlife dimension, as domestic students and students with lower GRE verbal scores were more likely to be in the life areas of study. The GRE verbal score, degree level, and undergraduate grade point average had the most impact on the pure/applied research dimension, as students having higher scores and grade point averages and students pursuing Ph.D.s were more likely to be in the pure research areas.

In their study, Powers and Lehman [57] found that black students were more likely to choose social sciences, and white students were more likely to choose biological sciences, humanities, and physical sciences. Women were more likely to choose biological sciences and education, and men were more likely to choose physical sciences. Older students (over 30) were

more likely to choose education, and younger students were more likely to choose biological and physical sciences.

Financial aid

While it is known that loans and graduate assistantships play large roles in the funding of graduate students, very few details are known about how students fund their graduate studies [28]. Smith [66] expressed concern that the increased indebtedness of undergraduates may be dissuading them from pursuing advanced study, and Snyder [67] indicated that decreased assistantship support from the federal government has compounded the problem. Given the lack of information that exists, Hauptman called for ongoing national research on this issue.

This search of the literature produced only two articles related to financial aid. In the first, Malaney [42] surveyed students and departmental administrators in order to investigate the importance of financial aid in student recruitment. The students reported financial reasons as the second most important factor in choosing an institution. In response to questions concerning assistantships, two-thirds of the administrators indicated that they felt they were not losing students because of the level of assistantship stipends. But slightly over two-thirds indicated that they felt they were losing students because they did not have enough assistantships to offer.

In the second study, Malaney [46] conducted a study of new graduate students at one institution in order to determine the characteristics of students who receive financial aid. He found that undergraduate grades had the strongest impact on receiving research assistantships and fellowships. He also discovered that students who had high verbal scores on the Graduate

Record Examination (GRE) and who were pursuing the Ph.D. instead of a master's degree were more likely to receive assistantships and fellowships. He also reported that women were more likely than men to take out loans, and minorities were more likely than nonminorities to receive fellowships.

Student characteristics and expectations

Articles in this subtopic were generally single-discipline studies with very simple research designs and a common purpose of characterizing the students in a given field at a particular institution. The one exception was a study by Baird [4] which was more general since it used some of the same national data as his previous study [3], and focused on the following four areas of advanced education: graduate study in arts and sciences, graduate study in education, professional study in law, and professional study in medicine. He compared the expectations of students before entering their chosen fields with their perceptions of the reality after one year of study. He found that

> over a third of the sample said that their expectations of what graduate or professional school would be like were not fulfilled, and that approximately 40 per cent said they would strongly consider changing to another program if they could do so without losing ground [4, p. 72].

Predicting Success, Performance

The articles in this section share the primary purpose of predicting the performance of graduate students. The majority of the studies follow a similar design in using fairly standard demographic predictor variables (e.g., gender, age, undergraduate grade point average, and standardized test scores) and common measures of performance (e.g., graduate grade point average and completion of degree). Most of the studies investigated only

one institution and one field of study which was usually education or business. The studies typically employed correlational and/or regression analyses, but path analysis, canonical correlation, and discriminant analysis were also used in a few studies.

One of the primary purposes of the studies in the field of business was to analyze the impact of the Graduate Management Admissions Test (GMAT) on academic performance in graduate school. The GMAT was found to be a good predictor of graduate grades [49, 68]. Messmer and Solomon also discovered that SAT scores and undergraduate grade point averages were good predictors of graduate grades. Sobol also found that a twelve-point scale related to students' backgrounds, activities, and personal qualities was a good predictor of graduate grades.

Cook and Swanson [17], Pristo [58], and Vacc and Picot [77] all studied doctoral degree completion in the field of education. Cook and Swanson were interested in predicting the probability of graduation from doctoral programs. Using path analysis, they found only two direct effects on graduation: having programs of study and dissertation proposals accepted. Knowing that accepted programs of study and dissertation proposals increase the likelihood of graduation is of questionable value, since a student generally cannot progess in a program without having an accepted program of study or dissertation proposal. However, the fact that the path analysis allows one to see the indirect effects of such variables as grades and holding assistantships is very useful. As a side note, age was shown to have a relatively strong, negative indirect effect on graduation which contrasts with Breaugh and Mann's [11] findings of a strong positive effect of age on the completion of the MBA degree.

Pristo [58] found that the following eight predictors made a

significant contribution in explaining cumulative graduate grade point average and degree completion: years since undergraduate degree, years since master's degree, master's grade point average, type of master's institution, graduate hours earned, number of institutions attended, age, and gender. The significant canonical correlation disappeared under cross-validation, but that may have been due to the disparity in sample sizes between the standard sample (N = 65) and the cross-validation sample (N = 21).

Vacc and Picot [77] discovered in a regression analysis that only graduate grade point average had a significant effect on explaining degree completion. The authors also had limited success using discriminant analysis to discriminate between successful and unsuccessful students, but that may have been due in part to sample size, which for the discriminant run entailed only 11 unsuccessful students.

The only other doctoral study in this section was conducted by Pogrow [55] who collected data for doctoral students in all fields at Stanford University. His primary concern was the effect of age on performance, and he determined that age did not adversely affect the attitudes and performance (grade point average) of first-year students. His sample was not large enough to analyze relationships by field of study.

Some of the studies in this topic were unique in their approach to predicting success. For instance, three of the studies used personality-related variables as predictors. Garett and Wulf [23] used selected personality scales from the Minnesota Multiphasic Personality Inventory and scores related to critical thinking skills from the Cornell Critical Thinking Test. Their analysis of education graduate students in one institution showed that for both males and females, critical thinking

ability was predictive of success in graduate school.

King, et al. [34] studied the hypothesis that anxiety proneness influences the intensity and frequency of anxiety manifestation which influences achievement on examinations, and the findings suggested that anxiety proneness had a direct causal influence on both anxiety manaifestation and achievement, as well as influencing achievement through anxiety manifestation. In a related study, Griffore [27] investigated fears of success and failure in relation to performance and discovered that while the factors are highly related, neither had much impact on examination performance.

Attrition and Retention

This area is closely related to predicting success and performance, but subtly different in that the issue of withdrawals from programs is of primary concern here. While the problem of graduate student retention has been discussed for decades, there has been very little systematic research conducted on this topic partly because of the difficulties involved in the design of such studies [24, 25]. While the studies initiated by Girves represent some of the best work to date on the retention of graduate students, the papers have not yet been published and therefore fall outside the parameters of this review. While the two articles to be reviewed in this section are much less sophisticated, they do present some interesting findings.

In his study of doctoral students in business, Pogrow [56] found a non-linear relationship between standardized test scores and degree completion. Both lower scorers and extremely high scorers were less likely to complete their degrees. He discovered a disproportionate number of

younger students with the highest test scores, and he found that older students were more likely than younger students to complete their degrees.

Jacks, et al. [30] studied "ABDs", students who had completed all degree requirements but their dissertations. The researchers conducted a telephone survey which involved approximately forty-minute interviews with 25 such individuals who had been out of school for about ten years. The individuals were from six different fields, 18 different departments, and 15 different universities. The study was presented in a qualitative nature, or as the authors indicate, a "narrative portrait" or "collective biography."

They discovered that almost half of the students indicated that they left because of financial difficulties, and almost half identified poor working relationships with the adviser or committee. Thirty-six percent identified substantive problems with the dissertation research, and 36 percent identified personal or emotional problems. They did find some differences by discipline. For instance, all of the psychologists (n = 8) cited problems with their advisers or committees, while all but one of the sociologists (n = 6) had good relations with their advisers and committees but many of them had problems with their dissertion research. Unfortunately, given the variations in departments and universities for each group, no specific conclusions can be drawn. If this study were conducted with more respondents and perhaps fewer institutions, more systematic conclusions might be reached.

Gender Differences

While differences between males and females have been discussed in several of the above research studies, gender differences were not the

primary focus of those studies. An analysis of gender differences was the major purpose of the studies in this section, which has been divided into three subsections: matriculation, sexual harrassment, and employment.

Matriculation

Most of the articles that have focused on gender differences have been related to matriculation and student characteristics. While women have traditionally been underrepresented in graduate education, there have been some positive advances in recent years, but there have also been some negative aspects as well. On the positive side, the proportion of women earning degrees in all aspects of higher education has increased, with the most pronounced increases being in professional and doctoral degrees [62]. While women still have a long way to go to be equal with men in terms of the number of earned professional and doctoral degrees, women are now virtually equal with men in the number of earned bachelor's and master's degrees [62].

On the negative side, Ethington and Wolfle [20] and Nielsen [52] found lower quantitative skills for women relative to men. Women are more likely to pursue master's degrees than doctorates [6]. Women are more likely to receive teaching assistantships while men are more likely to receive research assistantships, the latter of which, according to Solmon [69], appear to be more important in professional development. Men are reported to be more self-confident than women [1]. Women in more traditional sex roles need more external support from family and friends [12].

Two studies [60, 62] indicate that things have been getting better in recent years, but progess has been slow to come. Rice, who studied individuals who graduated in 1971 and 1975, found that "less than a fourth

of either sample of women reported positively on access to financial aid information or faculty encouragement for doctoral study" [60, p. 33]. Roemer's [62] study of degree selection among women from 1970 to 1978 shows the continuing low proportion of women pursuing doctorates. Rice noted that "Apparently, the effects of affirmative action programs, policies and changes in the interim period have been in raising awareness and consciousness rather that in changing actual experience" [60, p.36].

Sexual Harassment

Recently, a growing area of concern related to women graduate students has been that of sexual harassment by faculty members [18]. Schneider [63] did an excellent job of reviewing the literature on this topic in addition to completing her own study at one particular institution. She found that 60 percent of the women reported exeriencing at least one incident of "everyday harassment," which she defined as including stares, jokes, physical contact, passes, and sexual propositions. Nine percent (31 women) reported experiencing either coercive pressure to date or engage in sexual activity.

The behaviors of women students and the direct consequences of their interactions with faculty members were discussed by Schneider. The reactions of women students to sexual harassment and their actual dating of faculty members could have a negative impact on their graduate careers and on immediate employment, especially since the recommendations of faculty members are so crucial to the employment process, at least in the area of faculty employment.

Employment and Careers

As the studies in this subtopic show, women already have enough disadvantages in the job market. Even though women have experienced some recent advantages over men in admissions and financial aid, women have achieved less career progress [70], and new women Ph.D.s face higher unemployment relative to new male Ph.D.s [75].

Stark, et al. [70] reported that opportunities for women in male-dominated fields have appeared to improve, so these researchers turned their interest to the female-dominated field of education. Studying two groups of doctoral recipients, one of which received degrees between 1964 and 1970 and the other received degrees between 1974 and 1980, they found little evidence of institutional discrimination against women in either group. However, in both groups, men have made greater upward career advancement.

Wertheim, et al. [81] studied first-year graduate students in four different professional fields: business, education, law, and social work. They studied personality, aptitude, achievement, and demographics in an attempt to see if differences across fields were greater than differences between men and women in regard to professional career choices. They found that this was indeed the case, as sex differences were primarily limited to psychological masculinity/femininity and sex role attitudes, but men and women who had chosen the same field of career had similar aptitude, achievement, and demographic profiles.

Graduate Assistants

Thompson and Ellis indicated that the graduate assistantship within the field of education has had a lengthy and pervasive existence, but there has

been little effort to "assess its value and potential as a purposeful, integrated, practical and supervised component within graduate professional education preparation programs" [73, p. 78]. This observation is not limited to the field of education, since graduate assistantships are the primary means of funding graduate students in most fields. Nearly 40 percent of all doctorate recipients who received degrees in 1983 had held research assistantships and nearly 50 percent held teaching assistantships at some time while they were graduate students [28]. Given these figures, it is somewhat surprising that more research has not been conducted on this topic.

Most of the assistantship studies have dealt with teaching assistants. Carroll [13] provided a review of the research prior to 1977 on the effects of training programs for teaching assistants. He found very fragmented approaches to developing training programs and noted several issues to be considered by program developers. He emphasized that faculty interest and participation are crucial for a program's success.

More recently, Jackson and Simpson [31] attempted to discover the most popular methods of improving the effectiveness of teaching assistants. The authors conducted a study of the graduate deans at the 59 institutions that produced the largest number of Ph.D.s during the preceding ten years. Of the 56 institutions that responded, 64 percent indicated that efforts to improve the effectiveness of teaching assistants had improved in the past five years. Handbooks and awards for teaching assistants were the most common university-wide services provided for teaching assistants. In addition, institutions provided workshops and coursework for teaching improvement. Almost one-third of the institutions restricted the types of courses that teaching assistants could teach to low-level survey courses,

and another 23 percent indicated restrictions to undergraduate courses only. Twenty-one percent of the institutions required prior teaching experience from teaching assistants and 11 percent required admission to doctoral candidacy.

While most of the research on assistantships has focused on teaching assistantships, most of the funding has been focused on research assistantships [28]. And while both faculty and students believe that in general all assistantships are relevant to educational goals, programs, and career development [73], the only article in this study related to career development pertains to the research assistantship [61].

In the late 1960s, Roaden and Worthen conducted a nationwide study of all members of the American Educational Research Association "to elicit information about their research assistantship experience and their subsequent participation in educational research" [61, p. 143]. Of the 3963 respondents who returned a questionnaire, 1710 were identified as having a genuine research assistantship, which meant that "assisting in the conduct of research is the primary activity" [61, p. 143]. In addition to this first phase of data collection, the 50 most productive (obtaining research publications or grants) former research assistants and a random sample of 50 nonproductive former research assistants were asked to respond to another questionnaire.

The authors found many differences between the high producers and nonproducers on a variety of structural, experiential, perceptual, and supervisor-assistant interaction variables. For instance, being assigned to an individual faculty member and having adequate access to data analysis equipment led to more productivity. Research assistants who designed studies, wrote proposals, wrote articles, presented research papers, and

used a variety of statistical techniques, became more productive than their counterparts who did not do those things. Having intense professional interaction with the supervisor led to greater productivity. Research assistants who thought their supervisors viewed them as highly competent went on to be productive. While the study is impressive, unfortunately the data are now twenty years old.

Standardized Tests

Standardized tests such as the Graduate Record Examination (GRE), Miller Analogies Test (MAT), Law School Admissions Test (LSAT), Medical College Admissions Test (MCAT), and Graduate Management Admissions Test (GMAT) are used heavily in the admission process of graduate and professional schools. As has already been seen, the test scores have been included as predictor variables in some studies on matriculation and performance. While this category overlaps with those previously discussed studies, the articles in this category have the standardized tests as their primary emphasis and the other articles did not.

Most of the articles in this section that deal with matriculation or predicting performance yielded no findings that have not already been discussed. The one exception is a study by Oltman and Hartnett [53] who produced an excellent study on the role of the GRE in admissions. They surveyed department chairpersons in eight academic disciplines across institutions to determine (1) which programs required or recommended that students submit scores, (2) how the scores were used, (3) how important the users judged the scores to be, and (4) reasons for not recommending scores. They also collected data from The Graduate Programs and Admissions Manual.

The authors found that more than half of the 7000 master's programs and

more than three-fourths of the doctoral programs at least recommended that students submit GRE scores, and the percentage of programs with that policy ranged greatly both among and within disciplines. Most of the programs indicated that when an applicant's other credentials were strong the GRE scores were unimportant in admissions decisions. The GRE scores were not as important as undergraduate performance and recommendations. The primary reason that was given for not requiring the submission of scores was that the departments were getting along fine without them and the scores would add no additional useful information.

Some research on standardized tests that did not pertain to matriculation or predicting performance dealt with comparisons of the GRE and the MAT. Furst and Roelfs [22] studied doctoral students in one education program in order to determine which standardized test was a better predictor of success. Success was measured by grades in two specific courses and ratings on an analytical exercise which involved the writing of an essay. They found that the GRE was a much better predictor than the MAT. Stock, et al. [71] and Kagan and Stock [32] developed and tested methods of actually equating the scales of the GRE and the MAT.

Employment, Career

While Ph.D.s are not the most common by-product of graduate education, they have been the focus of most of the research in the area of employment. Two extensive research studies on this topic have been published in books that serve as very good references [14, 10]. Both of these works highlight the overproduction of Ph.D.s relative to the demand, and they question the value of such overproduction.

The most recent and comprehensive article focused on Ph.D. recipients

in six different fields three, five, and thirteen years after receiving their degrees [16]. The authors found that academic ability generally did not directly affect productivity or income, but it did have an indirect effect through its influence on the quality of the program that awarded the Ph.D., which influenced job setting and responsibilities. Specific findings included (1) individuals in research-oriented positions had more publications, (2) people in administrative or private research positions had higher incomes than people in academic teaching or research positions, and (3) women had lower incomes than men.

McCaffrey, et al. [47] used both freshman and senior undergraduates as well as graduate students in various fields of study to examine and compare their "career maturity." The authors refer to career maturity as a point on a continuum of career development where a student progresses through types of behaviors related to coping with decisions and activities necessary for career choice and progression. They found significant differences between freshman and seniors and freshman and graduate students but not between seniors and graduate students. They found no significant differences between men and women. Unfortunately, the authors did not discriminate on length of time in graduate school or degree level for the graduate students. Indeed, these factors were not mentioned at all, but the number of years in graduate school and the level of degree pursued could have an impact on career maturity.

Minorities

Research concentrating solely on minority graduate students is severely lacking, but a few studies were discovered. The largest study was conducted by Centra [15] who used data from the Educational Testing Service

to compare attitudes pertaining to the degree aspirations of subjects from eight different ethnic groups and three aggregated areas of study. He found that higher GRE verbal scores and grades were the most consistent predictors of doctoral degree aspirations across fields and ethnic groups. One other fairly consistent result across fields and ethnic groups was that males were more likely than females to aspire to doctoral degrees.

Admissions committees commonly believe that higher GRE scores are good predictors of future performance, although there has been a great deal of debate about that issue recently, especially in regard to the examination's possible bias against minorities. Scott and Shaw [64] add to that debate with the results of their study. They examined the relationship between GRE scores and performance, which was based on first-year graduate grade point averages, in order to see if there were differences between black and white students. For blacks and whites, Scott and Shaw discovered opposite relationships between GRE scores and grade point averages. For whites, grade point averages increased as GRE scores increased, but for blacks, grade point averages decreased as GRE scores increased. As one possible explanation of the results, the authors suggested motivational differences among blacks, meaning that blacks with low GRE scores worked harder to compensate for deficiencies and blacks with higher scores worked less. Their study warrants further investigation at other institutions.

Stress, Anxiety

It has been noted that the experiences of graduate education can produce high levels of stress and anxiety in many students as they proceed through the various stages of development [40]. The ability to stay in school might actually be related more to the coping styles and strategies

rather than academic skills [35].

Using modified versions of the Holmes and Rahe [29] Social Readjustment Rating Scale to measure the total Life Change Units, which are any experiences that result in a change in behavior in order to adapt or cope, Valdez [78] found that almost half of the 33 students in his study were experiencing "major crisis," which meant that they were in a high-risk category for illness. He also found very little illness among those students, and he accredited that fact to their ability to cope. While in fact that may be the case, it also may be that the rating instrument designed for a general population may not be valid for doctoral students, a point to which Valdez does allude.

Regarding coping behaviors, the purpose of the Kjerulff and Wiggins [35] study was to analyze how students responded to stressful situations. After collecting data on stressful situations and employing a three-mode factor analysis, two types of graduate students emerged: less competent and more competent. Among many findings, the authors noted that when faced with an academic failure type of situation, the first type felt responsible for the problem and the latter did not. Both felt anxious and depressed in that type of situation.

Several authors have offered suggestions to help alleviate stress. Williams, et al. [82] and Valdez [78] suggested a "buddy" or student-support system, where current students in a program are assigned to help new students even before the new students arrive on campus. Lange [40] developed a model of student anxiety and faculty support that could be shared between both faculty and students to help them realize what to expect in terms of anxiety and support as students progress through their degree programs.

Impact of Marriage, Family

Spouses and family members can play important roles in creating stress and providing support systems for graduate students. While it is not unusual for half of the graduate students in a given department or institution to be married [21], there has been very little research relating marriage and education, in general, and especially graduate education [48]. Studies before 1977 were reviewed by Gilbert [24], who concluded that graduate school is potentially destructive to family life, especially for married female students.

Lewis [41] interviewed thirty married women graduate students and their husbands, all of whom had been together from the beginning of the wife's studies through the current stage of writing her dissertation. She found that the relationships were most vulnerable during the first two terms of enrollment and during the time leading up to the comprehensive examination. She reported that the educational level of the husband did not make a difference in terms of marital adjustment, although one would think that if the husband had already obtained a doctorate or perhaps even a master's degree, he would be more prepared for his wife's ordeals. Unfortunately, Lewis did not indicate the demographic breakdowns of any variables, so the reader remains uniformed about the actual level of education for husbands in her sample.

On a related note, the purpose of McKeon and Piercy's [48] study was to determine if marital adjustment was higher when both spouses were students or when only one spouse was a student. They found that "the marital adjustment of students whose partners were also engaged in studies was significantly higher than that of students whose partners were not engaged in studies" [48, p.40].

Attitudes Toward Research

"Relationships between graduate education and academic research are intuitively accepted, but have been given limited examination" [74, p.43]. The knowledge and practice of research is an important part of graduate education, especially for Ph.D. students in non-applied fields of study, but very little is known about how students feel about research, how much they know about existing research studies, or what drives their own research studies. Three articles have addressed these topics.

Perl and Kahn [54] conducted a national study of psychology graduate students to assess their attitudes about research, and they found that generally, all students had positive attitudes toward research, but there were some differences depending on area of specialty. Students in non-applied areas were more interested in doing research in graduate school, and they reported actually doing more research than students in applied areas. They also reported that they were making greater progress on their dissertations, and they were more likely to have published articles and presented papers at conferences. They were simply more enthusiastic about research.

Toombs [74] was concerned about the levels of awareness and use of academic research by doctoral students, and to investigate these issues, he collected data from 470 students from a total of 18 departments in one university. He found a high level of awareness, measured by recognition of current departmental research projects and by whether research projects were linked to the dissertation. He also found a high level of usefulness of campus research for a student's own work.

Based on a study on 310 dissertation topics in the fields of higher education, counseling, and student personnel from 28 different

institutions, Aronson, et al. [2] indicated that individual programs and faculty members might be providing to much influence on the nature of dissertation topics. Several institutions had high percentages of dissertations in only one or two topic areas. The concern of the authors was that faculty preferences, not student preferences, were driving the selection of research topics.

In addition to a discussion of topic areas, the authors also provided a breakdown by populations studied and whether a theoretical, descriptive, or attitudinal orientation was employed. While this study is interesting in its approach, the authors attempted to draw too many conclusions from their data. It is very difficult to determine the major emphases of a dissertation by analyzing titles alone. The authors should have at least incorporated the use of Dissertation Abstracts International to assist them in speculating on the nature of the dissertations.

Miscellaneous

The six articles in this section cover a wide range of issues and could not be placed easily in any of the other topics. The following issues are covered: the part-time commuter student [59], the curiosity and motivational levels of undergraduate and graduate students [79], the importance of obtaining credentials or competence, [72, the application of adult development theories to graduate students [38], the question of how to find more student-oriented teachers [7], and graduate student satisfaction with academic programs [65].

Directions for Future Research

General Observations

Before offering any recommendations for specific types of future studies related to students, some general observations are in order. These general observations are discussed in terms of three research design foci: (1) the degree level of students studied, either master's or doctoral, (2) whether single or multiple fields of study were investigated, and (3) whether single or multiple institutions were studied. Such knowledge is important in terms of the generalizability of a study, as well as indicating gaps in the literature.

Table 2 provides information on the 94 research studies in terms of the three foci mentioned above. Several points are obvious based on the table. First, there has been a fairly even distribution of studies between single and multiple fields of study, 46 and 48, respectively. While on the surface this may appear as a positive venture into multiple-field studies, the figure is misleading. The problem lies in the fact that almost half (22 of 48) of the multiple-field studies do not actually specify individual fields. They are simply studies of students in all fields, and no analysis was done to distinguish separate fields. However, because graduate education is such a discipline-specific endeavor, investigating differences among fields is quite important, as evidenced by some of the 26 studies that have analyzed data by fields.

Another obvious point seen in Table 2 is the fairly even distribution between types of students studied, 20 master's and 21 doctorate. The not-so-obvious point pertains to the nature of the studies that fall in the non-specific/both category. Unfortunately, 43 of the 53 studies in this category are non-specific which means the reader either does not know

TABLE 2

Number of Student-Related Research Studies in Each of Three Foci

	Single Institution		Multiple Insitutions		
Type of Student	Single Field	Multiple Field	Single Field	Multiple Field	TOTAL
Master's	18	2	0	0	20
Doctorate	9	4	4	4	21
Non-specific/both	12	22	3	16	53
TOTAL	39	28	7	20	94

whether the students are master's or doctoral level or that only demographic counts were provided with no analysis by level of student. Some previous studies have shown that differences do exist between master's and doctoral students on certain issues, so future researchers must be cautious as to the nature of particular issues under investigation and as to whether the degree level may have an impact on the analysis of a specific issue.

The most interesting observation pertaining to research related to master's students is that none of the studies employed a multiple-institution design. In fact, all of the master's-only studies utilized fairly simplistic designs. Only two out of the 20 master's-only studies looked at more than one field. These findings add evidence to the long-standing criticisms by several individuals that not enough research has been devoted to master's education. Hauptman made the following point: "master's degree students are virtually an unknown quantity despite the fact that those students represent by far the largest component of advanced degree enrollments" [28, p. xiii]. More research devoted to master's students is definitely needed.

Looking at a more general breakdown of single- and multiple-institution studies, Table 2 indicates that only 27 of the 94 studies utilized more than one institution. While the proportion of multiple-institution studies is already low, there is also the fact that only one of those 27 studies aggregated institutions for comparative purposes. Granted, comparing graduate student opinions by institutions was not a purpose of any of these studies, but such analysis is needed. Differences among graduate institutions do exist, and it is likely that differences among students at various institutions would be found if such studies were conducted. In

fact, Malaney [44] mentioned this point in the comparison of his results to those of another study conducted at a different institution.

Specific Directions

While the above discussion alludes to various areas where improvements could be made in the general design of research related to graduate students, there are also several specific topics that warrant further research. Some of these topics were mentioned earlier but are elaborated here, while other suggestions have not been mentioned previously.

First, pertaining to the studies on predicting success in graduate school, most of the previous research has focused on such predictors as standardized test scores, grades, and other academic measures, but a large part of success in graduate school seems to involve traits not related to academics. More work needs to be done relating personality variables such as stamina or perseverance, will power, and motivation with success in graduate school. Given the extraordinary amounts of work and time demands placed on students, organizational ability might also prove to be an important predictor of success. The ability to interact positively with others, especially faculty, could also be an important factor.

Regarding financial concerns, a major point in Hauptman's [28] book deals with the lack of information that exists on how graduate and professional students finance their advanced studies. He suggested that surveys of currently enrolled graduate and professional students be taken periodically to determine exactly how they finance their studies. He also suggested that additional surveys should concentrate on undergraduate borrowers to study the impact of debt on various issues, including desire to pursue advanced study.

There has been very little theory-based or theory-generating research. The study by Kuh and Thomas [38] on adult development theory was intriguing because of the attempt to apply existing theories to a graduate student population. While graduate students may have certain similarities to the general population, they are also different in many respects. In fact, a theory on graduate student development is probably in order. The various transitions that graduate students must endure can be perceived as developmental. It is likely that behavioral modifications do occur over time due to graduate experiences. This is most likely true of doctoral students who often take many years to complete their degrees. In order to study such developmental processes, some type of longitudinal design would be ideal.

There clearly has not been enough research on minorities in graduate education. With the current trend of decreasing enrollment for blacks in graduate school this issue becomes more crucial for that population. One can speculate that much of the problem of decreasing enrollments is due primarily to financial concerns, but research is needed to verify this speculation. Another potential reason may be related to the perceived value of advanced degrees.

Another area of concern regarding minority graduate students is the quality of life they experience in academic departments and universities as a whole. Minority graduate students are very underrepresented in some fields and institutions, as are minority faculty members to serve as role models. The particular concerns of these students must be understood, especially in order to increase their enrollments and retention rates. Research along these lines is needed desperately.

One possible reason for a lack of research on minority students could

be simply due to the low number of students in particular fields and institutions. The low numbers are especially dissuasive of the quantitative analytical techniques which have become so dominant in higher education research in general, but the low numbers do not prohibit qualitative research. In fact, methods such as ethnography should be particularly appealing for trying to understand the general climate for minority students and their experiences in trying to pursue graduate education in certain fields of study and in certain institutions. Such research techniques have been overlooked in graduate education research, and in some cases, they may be the best techniques to utilize. The complex issue of minority graduate education appears to be an appropriate area for their utilization.

Conculsion

There is a strong need for ongoing national, longitudinal data related to graduate students. Such research would help administrators of graduate education in several areas, from recruitment to retention to employment. In fact, some topics such as retention are desparately in need of longitudinal designs. While the need exists, the vehicle for such research is still a mystery. While the new Center for Research in Graduate Education at the University of Rochester may be such a vehicle in the future, its focus is to be directed toward the top research universities in the country, so the data may not be representative of graduate students in general. Hauptman has suggested that the annual survey conducted by the Council of Graduate Schools and the GRE Board "should be revamped and expanded to become the reliable national data source on graduate student enrollments" [28, p. xiv]. Whether this suggestion is viable is dependent

upon the two organizations themselves, but it seems like a good recommendation.

Clearly, there are many more directions that future research on graduate education can take, but there is also another question to consider: How does one stimulate such research? One possible answer is the creation of a new academic journal for research on graduate education. Of course, a new academic journal can only exist if there is enough quality research to fill the pages. Based on the research studies that were reviewed in this chapter, a potential editor may have cause for concern. Another potential problem for the field of higher education, as a whole, is that a new journal would likely attract articles that are currently being published in existing higher education journals, which may need those articles for their own survival. Regardless of the costs, an academic journal devoted solely to issues and research on graduate education could be valuable in stimulating new research and attracting new researchers to this area.

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